

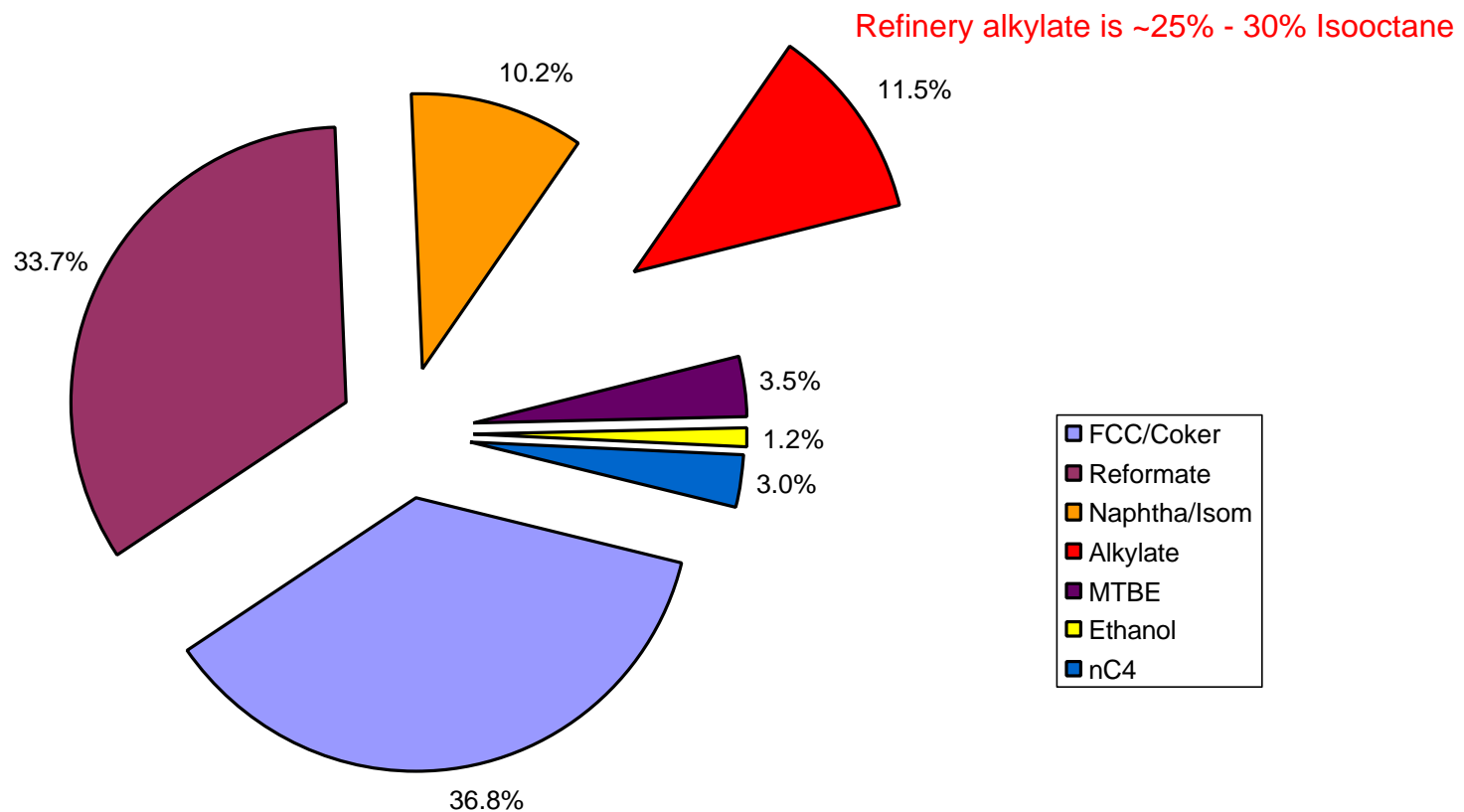
Production, Distribution, Use, and Environmental Considerations of Alkylate 100SM

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Presentation Overview

- 1) Alkylates have been in gasoline since 1938
- 2) Alkylate 100SM (a.k.a isooctane) has many advantages to refinery grade alkylate
- 3) C8 alkylates are not conducive to California specifications
- 4) Alkylate 100SM has favorable water properties

2000 US Gasoline Composition 8.4 Million barrels/day



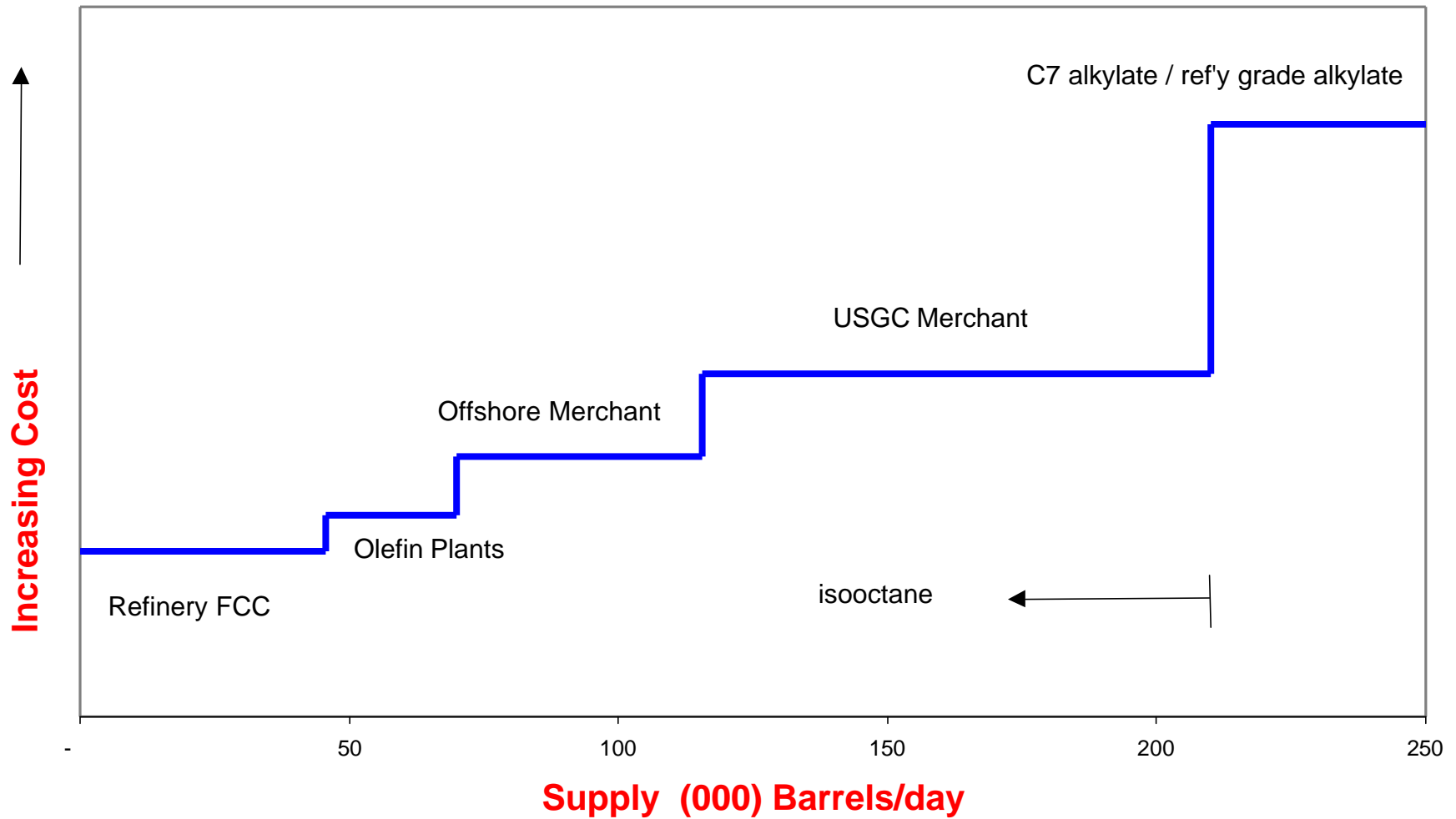
Alkylate 100SM has many Advantages to refinery grade alkylate

- Higher Octane
 - 100 versus 92-94
- Lower volatility
 - 3 RVP versus 5-7
- Lower boiling point
 - 210 versus 230-240
- Merchant market potential
- Product flexibility (alkene or alkane)
- Different production processes

Alkylate 100SM is made differently than refinery grade alkylate

- Most MTBE facilities can be modified to produce Alkylate 100SM
- Low conversion costs (per MBD)
 - \$3 - \$6 million versus \$15 - \$30 million
- Production process requires no liquid acid step
 - Refinery processes subject to hydrofluoric and sulfuric acids

US Alkylate Supply Curve



April 11, 2001

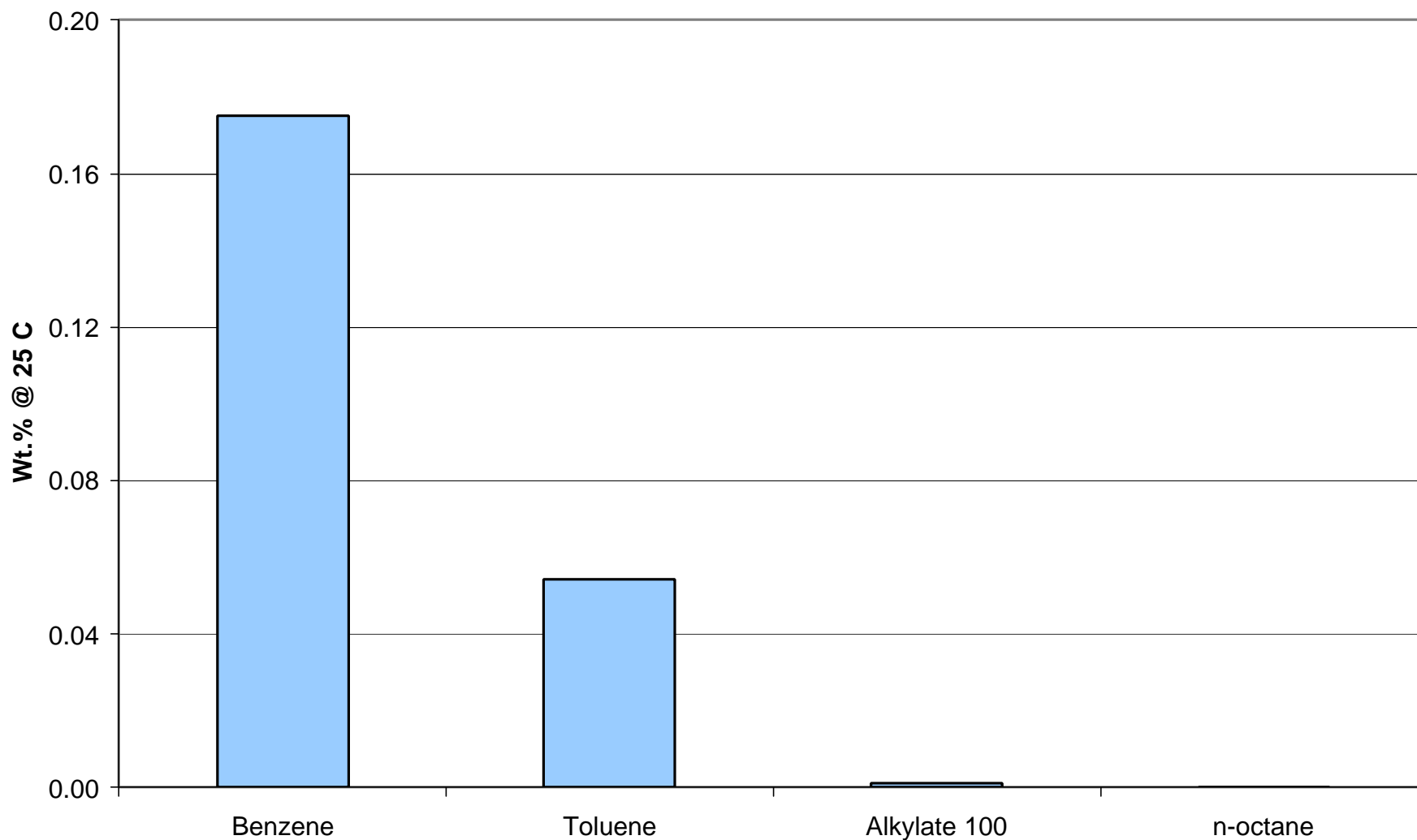
Alkylate 100SM is not conducive to CA RFG specifications

- T50 specification too tight @ 213 °F
 - 90% of all California gasoline falls in range of 182 to 210 °F
 - T50 will increase 10 °F with removal of MTBE
- Deminimus levels of oxygenates too restrictive and without basis
 - Prohibition calls for 0.05% max by 2004 for all oxygenates except ethanol
 - Would likely negate refinery based isooctane.
 - All ethers are not the same

Alkylate 100SM has favorable water properties

<i>Physical Properties</i>	<i>Alkylate 100SM</i>	<i>Benzene</i>	<i>Ethanol</i>
Water Solubility (mg/l)	11	1,730	Infinity
Volatility RVP (psi)	3	5	18
Henry's Law constant	93	0.23	0.0002
Adsorption Coefficient (Log K _{oc})	2.5	1.7	0.7
Other			Net Energy Value <1

Water Solubility of Key Gasoline Components



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Summary

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